

IN THE CLAIMS:

Please CANCEL claims 5-8, 14, 19-22 and 28, without prejudice or disclaimer.

Please AMEND the claims as follows:

1. (CURRENTLY AMENDED) An apparatus with a dual-writing function comprising:
 - a first module for controlling an interface to an external apparatus;
 - a plurality of second modules each having a cache memory; and
 - a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second ~~module~~ modules for data transfer therebetween,

said first module including address designation means for producing addressing information to designate two written-in destinations for writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules, and

said bridge module including:

 - address production means for analyzing said addressing information, which is received together with said data to be written from said first module, to produce two transferred-to addresses for designation of said two second modules having said cache memories in which said data is to be actually written and to produce written-in addresses in said cache memories; and
 - data transfer control means for controlling data transfer from said bridge module to said second modules so that, after said data is transferred to the two second modules corresponding to said two transferred-to addresses, said data is written at said written-in address in said cache memory of each of the two second modules,

wherein

 - said two second modules are set in mirror relation to each other,
 - one of the two second modules includes management means for managing information on the other of the two second modules and for managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module, and
 - said address designation means of said first module produces said addressing information on the basis of information acquired from said management means of any one of the two second modules.

2. (CURRENTLY AMENDED) The apparatus with a dual-writing function according to claim 1, wherein said address designation means designates, in said addressing information, ~~an a~~ page address in said cache memory of each of said second modules and an offset address in a page designated by said page address, as said written-in address for said data in said cache memory.

3. (ORIGINAL) The apparatus with a dual-writing function according to claim 2, wherein said address designation means designates, in said addressing information, specific information for specifying said two second modules having said cache memories in which said data is to be actually written, as said two transferred-to addresses for said data.

4. (CURRENTLY AMENDED) The apparatus with a dual-writing function according to claim 3, wherein said interface bus is a PCI (Peripheral Component Interconnect) bus, and numbers for specifying said PCI ~~buses~~ bus for said two second modules are designated as said specific information.

5. (CANCELED)

6. (CANCELED)

7. (CANCELED)

8. (CANCELED)

9. (CURRENTLY AMENDED) The apparatus with a dual-writing function according to ~~claim 5~~ claim 1, wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module ~~each of said second modules~~ preserves the readout data in a mirror area of said cache memory of the other second module, ~~which is in the mirror relation to this second module,~~ on the basis of a situation of management by said management means.

10. (CURRENTLY AMENDED) The apparatus with a dual-writing function according to ~~claim 6~~ claim 2, wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module ~~each of said second modules~~ preserves the readout data in a mirror area of

said cache memory of the other second module, ~~which is in the mirror relation to this second module,~~ on the basis of a situation of management by said management means.

11. (CURRENTLY AMENDED) The apparatus with a dual-writing function according to ~~claim 7~~claim 3, wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module ~~each of said second modules~~ preserves the readout data in a mirror area of said cache memory of the other second module, ~~which is in the mirror relation to this second module,~~ on the basis of a situation of management by said management means.

12. (CURRENTLY AMENDED) The apparatus with a dual-writing function according to ~~claim 8~~claim 4, wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module ~~each of said second modules~~ preserves the readout data in a mirror area of said cache memory of the other second module, ~~which is in the mirror relation to this second module,~~ on the basis of a situation of management by said management means.

13. (CURRENTLY AMENDED) An apparatus with a dual-writing function comprising:
a first module for controlling an interface to an external apparatus;
a plurality of second modules each having a cache memory; and
a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second ~~module~~ modules for data transfer therebetween,

said first module writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules, and

said two second modules are set in mirror relation to each other, and
one of the two ~~each of said second modules~~ including management means for managing information on the other of the two second modules ~~the second module which is in mirror relation to this second module~~ and for managing ~~the an~~ association between a master area address in said cache memory of the one ~~in this second module~~ and a mirror area address in said cache memory of the other second module ~~being in the mirror relation to this second~~

module,

wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said management means.

14. (CANCELED)

15. (CURRENTLY AMENDED) A storage control apparatus placed between a disk unit and a host for controlling access to said disk unit by said host, said storage control apparatus comprising:

a disk interface module for controlling an interface to said disk unit;

a host interface module for controlling an interface to said host;

a plurality of management modules, each including a cache memory, for generally controlling the entire apparatus; and

a bridge module connected through an interface bus to said disk interface module, said host interface module and said management modules for making connections among said disk interface module, said host interface module and said management modules for data transfer among said disk interface module, said host interface module and said management modules,

said host interface module including:

address designation means for producing addressing information to designate two written-in destinations for writing data to be written, which is received from said host, through said bridge module into said cache memories of two of said plurality of management modules, and

said bridge module including:

address production means for analyzing said addressing information, which is received together with said data to be written from said host interface module, to produce two transferred-to addresses for designation of said two management modules having said cache memories in which said data is to be actually written and to produce written-in addresses in said cache memories; and

data transfer control means for controlling data transfer from said bridge module to said management modules so that, after said data is transferred to the two

management modules corresponding to said two transferred-to addresses, said data is written at said written-in address in said cache memory of each of the two management modules,

wherein

said two management modules are set in mirror relation to each other,

one of the two management modules includes management means for managing information on the other of the two management modules and for managing an association between a master area address in said cache memory of the one management module and a mirror area address in said cache memory of the other management module, and

said address designation means of said host interface module produces said addressing information on the basis of information acquired from said management means of any one of the two management modules.

16. (CURRENTLY AMENDED) The storage control apparatus according to claim 15, wherein said address designation means designates, in said addressing information, ~~an~~ a page address in said cache memory of each of said management modules and an offset address in a page designated by said page address, as said written-in address for said data in said cache memory.

17. (ORIGINAL) The storage control apparatus according to claim 16, wherein said address designation means designates, in said addressing information, specific information for specifying said two management modules having said cache memories in which said data is to be actually written, as said two transferred-to addresses for said data.

18. (CURRENTLY AMENDED) The storage control apparatus according to claim 17, wherein said interface bus is a PCI (Peripheral Component Interconnect) bus, and numbers for specifying said PCI ~~buses~~ bus for said two management modules are designated as said specific information.

19. (CANCELED)

20. (CANCELED)

21. (CANCELED)

22. (CANCELED)

23. (CURRENTLY AMENDED) The storage control apparatus according to ~~claim~~ 49claim 15, wherein, in a case in which a capacity of a master area of said cache memory of the one management module runs short when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, ~~the one management module each of said management modules~~ preserves the readout data in a mirror area of said cache memory of the other management module, ~~which is in the mirror relation to this management module~~, on the basis of a situation of management by said management means.

24. (CURRENTLY AMENDED) The storage control apparatus according to ~~claim~~ 20claim 16, wherein, in a case in which a capacity of a master area of said cache memory of the one management module runs short when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, ~~the one management module each of said management modules~~ preserves the readout data in a mirror area of said cache memory of the other management module, ~~which is in the mirror relation to this management module~~, on the basis of a situation of management by said management means.

25. (CURRENTLY AMENDED) The storage control apparatus according to ~~claim~~ 24claim 17, wherein, in a case in which a capacity of a master area of said cache memory of the one management module runs short when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, ~~the one management module each of said management modules~~ preserves the readout data in a mirror area of said cache memory of the other management module, ~~which is in the mirror relation to this management module~~, on the basis of a situation of management by said management means.

26. (CURRENTLY AMENDED) The storage control apparatus according to ~~claim~~ 22claim 18, wherein, in a case in which a capacity of a master area of said cache memory of the one management module runs short when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, ~~the one management module each of said management modules~~ preserves the readout data in a mirror area of said cache memory of the other management module, ~~which is in the mirror relation to this management module~~, on the basis of a situation of

management by said management means.

27. (CURRENTLY AMENDED) A storage control apparatus placed between a disk unit and a host for controlling access to said disk unit by said host, said storage control apparatus comprising:

- a disk interface module for controlling an interface to said disk unit;
- a host interface module for controlling an interface to said host;
- a plurality of management modules for ~~generally~~controlling the entire control ~~unit~~apparatus; and
- a bridge module connected through an interface bus to said disk interface module, said host interface module and said management modules for making connections among said disk interface module, said host interface module and said management modules for data transfer among said modules,

said host interface module writing data to be written, which is received from said host, through said bridge module into cache memories of two of said plurality of management modules, and

said two management modules are set in mirror relation to each other, and
one of the two ~~each of said~~ management modules including management means for managing information on the other of the two management modules ~~the management module which is in mirror relation to this management module~~ and for managing ~~the an~~ association between a master area address in said cache memory of the one ~~in this~~ management module and a mirror area address in said cache memory of the other ~~management module being in the mirror relation to this management module~~,

wherein, in a case in which a capacity of a master area of said cache memory of the one management module runs short when data read out from said disk unit through said disk interface module and said bridge module is temporarily preserved in the cache memory of the one management module, the one management module preserves the readout data in a mirror area of said cache memory of the other management module on the basis of a situation of management by said management means.

28. (CANCELED)

29. (NEW) An apparatus comprising:

- a first module controlling an interface to an external apparatus;

a plurality of second modules each having a cache memory; and
a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second modules for data transfer therebetween,

said first module including an address designator producing addressing information to designate two written-in destinations for writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules, and

said bridge module including:

address production producer analyzing said addressing information, which is received together with said data to be written from said first module, and producing two transferred-to addresses for designation of said two second modules having said cache memories in which said data is to be actually written and producing written-in addresses in said cache memories; and

data transfer controller controlling data transfer from said bridge module to said second modules so that, after said data is transferred to the two second modules corresponding to said two transferred-to addresses, said data is written at said written-in address in said cache memory of each of the two second modules,

wherein

said two second modules are set in mirror relation to each other,

one of the two second modules includes a manager managing information on the other of the two second modules and managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module, and

said address designator of said first module produces said addressing information on the basis of information acquired from said manager of any one of the two second modules.

30. (NEW) An apparatus comprising:

a first module controlling an interface to an external apparatus;

a plurality of second modules each having a cache memory; and

a bridge module connected through an interface bus to said first and second modules for accomplishing a connection between said first module and said second modules for data transfer therebetween,

said first module writing data to be written, which is received from said external apparatus, through said bridge module into said cache memories of two of said plurality of second modules,

said two second modules are set in mirror relation to each other, and

one of the two second modules including a manager managing information on the other of the two second modules and managing an association between a master area address in said cache memory of the one second module and a mirror area address in said cache memory of the other second module,

wherein, in a case in which a capacity of a master area of said cache memory of the one second module runs short when data to be read out through said bridge module into said first module is temporarily preserved in the cache memory of the one second module, the one second module preserves the readout data in a mirror area of said cache memory of the other second module on the basis of a situation of management by said manager.